In the Claims

1. (Previously Presented) A method of multi-slice image acquisition with black-blood contrast comprising:

applying a non-selective inversion pulse;

applying a re-inversion pulse that is slice-selective over a region encompassing a plurality of slice selections;

timing execution of a series of RF excitation pulses such that signal from blood is near a null point; and

acquiring data for the plurality of slice selections.

2. (Original) The method of claim 1 wherein the plurality of slice selections include all slice selections in a slab to be imaged.

3. (Original) The method of claim 1 wherein the images are acquired over more than a single breath-hold.

4. (Original) The method of claim 1 wherein the re-inversion pulse is applied over a region having all slice selections in a slab and data are acquired for all slice selections in the slab using a single re-inversion pulse.

5. (Original) The method of claim 1 further comprising creating the inversion pulse with slice thickness given by:

slice thickness = $(Z_1 - Z_n) + 4 *$ opslthick,

where Z_1 and Z_n represents spatial locations of first and last slices selected for imaging, and opslthick represents a desired imaging slice thickness.

6. (Original) The method of claim 5 further comprising creating the re-inversion pulse with a center centered about a midpoint between Z_1 and Z_n.

7. (Original) The method of claim 1 wherein the timing step includes selecting an inversion time TI such that the null point of the blood occurs near a center of the multi-slice acquisition.

8. (Previously Presented) The method of claim 1 wherein the series of RF excitation pulses is fast spin echo readout pulses and wherein the method further comprises modifying a flip angle of RF excitation pulses executed before and after an occurrence of the null point of the blood to improve blood suppression.

9. (Original) The method of claim 8 further comprising modifying the flip of RF excitation pulses occurring before the null point to slightly less than 90° and those occurring after the null point to slightly more than 90°.

10. (Previously Presented) A computer program having a set of instructions that when executed by a computer cause the computer to:

generate and cause application of a non-selective inversion RF pulse to a slab of slices each having a thickness;

generate and cause application of a slice-selective re-inversion RF pulse having a slice thickness greater than the thickness of a single slice;

apply an inversion time;

apply RF excitations; and

acquire MR data.

11. (Original) The computer program of claim 10 wherein the slice thickness of the re-inversion pulse is selected greater than the slab of slices to allow for cardiac motion between the application of the slice-selective re-inversion RF pulse, and the acquisition of MR data.

12. (Previously Presented) The computer program of claim 10 wherein the RF excitations have a flip angle greater than 90° for segments after a null point and less than 90° for segments before the null point.

13. (Original) The computer program of claim 10 wherein the sequence is applicable over one or more R-R intervals.

20. (Original) The MR apparatus of claim 19 wherein excitation pulses occurring near a mid-point of the series have a flip angle near 90° and excitation pulses occurring before a mid-point have a flip angle less than 90° and excitation pulses occurring after the mid-point have a flip angle more than 90°.

21. (Previously Presented) A pulse sequence for use in multi-slice MR data acquisition comprising:

a non-selective inversion pulse applicable to a slab of slices;

a slice-selective re-inversion pulse applicable to at least a number of slices in the slab of slices; and

a series of excitation pulses applicable to the at least a number of slices in the slab of slices after an inversion time.

22. (Original) The pulse sequence of claim 21 wherein the inversion time is selected to allow signal from blood in a mid-point of the at least a number of slices to approach a null point.

23. (Original) The pulse sequence of claim 21 wherein the at least a number of slices includes all slices in the slab of slices.

24. (Original) The pulse sequence of claim 21 wherein the at least a number of slices includes fewer slices than those in the slab of slices but more than one.

25. (Original) The pulse sequence of claim 21 wherein the at least a number of slices includes more slices than those in the slab of slices.

26. (Original) The pulse sequence of claim 21 wherein the non-selective inversion pulse has a thickness given by:

slice thickness = $(Z_1 - Z_n) + 4 * \text{opslthick}$,

where Z_1 and Z_n represents spatial locations of first and last slices selected for imaging, and opslthick represents a desired imaging slice thickness.

27. (Original) The pulse sequence of claim 26 wherein the slice-selective re-inversion pulse has a center centered about a mid-point between Z_1 and Z_n.

28. (Previously Presented) The pulse sequence of claim 21 wherein the series of excitation pulses have varying flip angles and are fast spin echo readout excitation pulses.

29. (Original) The pulse sequence of claim 28 wherein excitation pulses that occur before a mid-point of the series have a flip angle of less than 90°, those near the mid-point have a flip angle near or at 90°, and those that occur after the mid-point have a flip angle greater than 90°.